

1998

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BOX PCT
Page 1 of 3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
REQUEST FOR FILING NATIONAL PHASE OF
PCT APPLICATION UNDER 35 U.S.C. 371 AND 37 CFR 1.494 OR 1.495

To: The Commissioner of Patents
 and Trademarks
 Washington, D.C. 20231

(Our Deposit Account No. 03-3975
 (Our Order No. 11765 / 245063
 C# / M#

TRANSMITTAL LETTER TO THE UNITED STATES
 DESIGNATED/ELECTED OFFICE (DO/EO/US)

Atty. Dkt. PMS245063 / P5148US
 M# / Client Ref.

From: Pillsbury Madison & Sutro LLP, IP Group

Date: February 13, 1998

This is a **REQUEST** for **FILING** a PCT/USA National Phase Application based on:

- | | | |
|------------------------------|------------------------------|-------------------------------------|
| 1. International Application | 2. International Filing Date | 3. Earliest Priority Date Claimed |
| <u>PCT/ GB96 /01996</u> | <u>15 August 1996</u> | <u>16 August 1995</u> |
| ↑ country code | Day MONTH Year | Day MONTH Year |
| | | (use item 2 if no earlier priority) |
4. Measured from the earliest priority date in item 3, this PCT/USA National Phase Application Request is being filed within:
- (a) ☐ 20 months from above item 3 date (b) ☒ 30 months from above item 3 date,
- (c) Therefore, the due date (unextendable) is February 16, 1998.
5. Title of Invention COMPUTER SYSTEM FOR IDENTIFYING LOCAL RESOURCES
6. Inventor(s) PHELAN, Sean

Applicant herewith submits the following under 35 U.S.C. 371 to effect filing:

7. ☒ Please immediately start national examination procedures (35 U.S.C. 371(f)).
8. ☒ **A copy of the International Application** as filed (35 U.S.C. 371(c)(2)) is transmitted herewith (file if in English but, if in foreign language, file only if not transmitted to PTO by the International Bureau) including:
- a. ☒ Request;
- b. ☐ Abstract;
- c. 23 pgs. Spec. and Claims;
- d. 2 sheet(s) Drawing which are ☐ informal ☒ formal of size ☒ A4 ☐ 13" ☐ 14"
9. ☒ **A copy of the International Application has been transmitted by the International Bureau.**
10. **A translation of the International Application** into English (35 U.S.C. 371(c)(2))
- a. ☐ is transmitted herewith including: (1) ☐ Request; (2) ☐ Abstract;
- (3) _____ pgs. Spec. and Claims;
- (4) _____ sheet(s) Drawing which are:
- ☐ informal ☐ formal of size ☐ A4 ☐ 11"
- b. ☐ is not required, as the application was filed in English.
- c. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
- d. ☐ Translation verification attached (not required now).
11. ☒ **PLEASE AMEND** the specification before its first line by inserting as a separate paragraph:

—This application is the national phase of international application PCT/ GB96 /01996
 filed August 15, 1996 which designated the U.S.—

12. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., before 18th month from first priority date above in item 3, are transmitted herewith (file if in English but, if in foreign language, file only if not transmitted by the International Bureau) including:
13. ☒ PCT Article 19 claim amendments (if any) have been transmitted by the International Bureau.
14. ☐ Translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., of claim amendments made before 18th month, is attached (required by 20th month from the date in item 3 if box 4(a) above is X'd, or 30th month if box 4(b) is X'd, or else amendments will be considered cancelled).
15. **A declaration of the inventor** (35 U.S.C. 371(c)(4))
 a. ☒ is submitted herewith ☒ Original ☐ Facsimile/Copy
 b. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
16. **An International Search Report (ISR):**
 a. Was prepared by ☒ European Patent Office ☐ Japanese Patent Office ☐ Other
 b. ☒ has been transmitted by the International Bureau to PTO.
 c. ☒ copy herewith (2 pg(s).) ☒ plus Annex of family members (1 pg(s).).
17. **International Preliminary Examination Report (IPER):**
 a. ☒ has been transmitted (if this letter is filed after 28 months from date in item 3) in English by the International Bureau with Annexes (if any) in original language.
 b. ☒ copy herewith in English
 c.1 ☐ IPER Annex(es) in original language ("Annexes" are amendments made to claims/spec/drawings during Examination) including attached amended:
 c.2 ☐ Specification/claim pages # _____ ☐ Drawing Sheets # _____
 c.3 ☐ Which resulted in cancellation of pages # _____ claims # _____
 Dwg Sheets # _____
 d. ☐ Translation of Annex(es) to IPER (required by 30th month due date, or else annexed amendments will be considered cancelled).
18. **Information Disclosure Statement** including:
 a. ☒ Attached Form PTO-1449 listing documents
 b. ☒ Attached copies of documents listed on Form PTO-1449
 c. ☒ A concise explanation of relevance of ISR references is given in the ISR.
19. ☐ **Assignment** document and Cover Sheet for recording are attached. Please mail the recorded assignment document back to the person whose signature, name and address appear at the end of this letter.
20. ☐ Copy of Power to IA agent.
21. ☐ **Drawings:** _____ sheet(s) per set: ☐ 1 set informal; ☐ Formal of size ☐ A4 ☐ 11"
22. ☒ 1 (No.) **Verified Statement(s)** establishing "small entity" status under Rules 9 & 27
23. **Priority** is hereby claimed under 35 U.S.C. 119/365 based on the priority claim and the certified copy, both filed in the International Application during the international stage based on the filing in (country) GREAT BRITAIN of:
- | <u>Application No.</u> | <u>Filing Date</u> | <u>Application No.</u> | <u>Filing Date</u> |
|------------------------|------------------------|------------------------|--------------------|
| (1) <u>9516762.3</u> | <u>August 16, 1995</u> | (4) _____ | _____ |
| (2) _____ | _____ | (5) _____ | _____ |
| (3) _____ | _____ | (6) _____ | _____ |
- a. ☒ See Form PCT/IB/304 sent to US/DO with copy of priority documents. If copy has not been received, please proceed promptly to obtain same from the IB.
 b. ☐ Copy of Form PCT/IB/304 attached.
24. Attached:
25. **Preliminary Amendment:** Please cancel claims 4 - 29 without prejudice.

25.5 Per item 17.c3, **cancel original** pages # _____, claims # _____, Drawing Sheets # _____26. **Calculation of the U.S. National Fee (35 U.S.C. 371 (c)(1)) and other fees is as follows:**
based on amended claim(s) per above item(s) [] 12, [] 14, [] 17, [XX] 25 [] 25.5 (hilitte)

					Large/Small Entity		Fee Code
TOTAL EFFECTIVE CLAIMS	<u>3</u>	- 20 =	* <u>0</u>	x	\$ 22/\$11	= \$	(966/967)
INDEPENDENT CLAIMS	<u>1</u>	- 3 =	* <u>0</u>	x	\$ 82/\$41	= \$	(964/965)

*If answer <0, enter "0"

If any proper (ignore improper) MULTIPLE DEPENDENT CLAIM is present, ----- add \$270/\$135 + _____
(968/969)

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(4)):->>>>>BASIC FEE REQUIRED, NOW->>>>>

A. If country code letters in item 1 are not "US", "BR", "BB", "TT", "MX", "IL" or "NZ"

See item 16 re:

1. Search Report was <u>not</u> prepared by EPO or JPO -----	add \$1070/\$535	+	_____	(960/961)
2. Search Report was prepared by EPO or JPO -----	add \$930/\$465	+	<u>465.00</u>	(970/971)

SKIP B, C, D AND E UNLESS country code letters in item 1 are "US", "BR", "BB", "TT", "MX", "IL" or "NZ"

-> [] B. If neither international search fee nor international preliminary examination fee was paid to USPTO, ----- add \$1070/\$535 + _____ (960/961)

(X) (only) -> [] C. If international search fee was paid to USPTO but not international preliminary examination fee, ----- add \$790/\$395 + _____ (958/959)

(one) (of) (these)-> [] D. If international preliminary examination fee was paid to USPTO ----- add \$720/\$360 + _____ (956/957)

(4) (boxes) -> [] E. If international preliminary examination fee was paid to USPTO and Rules 492(a)(4) and 496(b) satisfied, ----- add \$98/\$49 + _____ (962/963)

27. **SUBTOTAL = \$ 465.00**

28. If Assignment box 19 above is X'd, add Assignment Recording fee of ----- \$40.00 + _____ (96)

29. Attached is a check to cover the ----- **TOTAL FEES \$ 465.00****CHARGE STATEMENT:** The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 and 492 (missing or insufficient fee only) now or hereafter relative to this application and the resulting Official document under Rule 20, or credit any overpayment, to our Account/Order Nos. shown in the heading hereof for which purpose a duplicate copy of this sheet is attached.**This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal form is filed.****Pillsbury Madison & Sutro LLP**
Intellectual Property Group1100 New York Avenue
Ninth Floor, East Tower
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Atty/Sec: DSL:mhnBy Atty: Dale S. Lazar Reg. No. 28,872

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COMPUTER SYSTEM FOR IDENTIFYING LOCAL RESOURCES

This invention relates to computer systems, and to methods of operating computer systems. The invention has particular relevance to the so called "World Wide Web", which is part of the global computer network system known as the Internet.

The Internet and the World Wide Web ("WWW" or "The Web") have been described in great detail in a large number of publications in recent months. The Web consists essentially of an enormous number (at the last count, many millions, and expanding rapidly) of "host" or "server" computers which contain information of various types which users may wish to access. Users of the system employ a "client" computer, running "client" software, in order to access the information. Such client programs are usually known as "browsers".

Various standard protocols enable requests to be formulated by the many client computers, and passed via the Internet to whichever computer holds the relevant information, which then returns the information to the client, using the same protocols.

The protocol which is used on the World Wide Web is an agreed standard, known as the HyperText Transfer Protocol (HTTP).

The language in which "Web" pages are generated is known as "HyperText Markup Language" (HTML).

The success of HTML/HTTP is based to a large extent on the ability of HTTP to produce so called "hypertext links" in the form of some sort of displayable icon on the computer screen of the client. The icon may be a graphical icon, or, more commonly, simply text represented in a form which is visually distinct from the surrounding text. Activating the icon with a pointing device (for example, clicking on it with a mouse pointer) causes the browser software to formulate a request for further information to

be sent to the "client". This further information may be simply a "page" of text data, or it may be graphical data, or sound or video data. It may reside on the same server computer as the page containing the hypertext link, but
5 need not do so, and will often reside on a computer many thousands of miles away.

The World Wide Web has recently attracted increasing attention as an advertising medium for various goods and services. The advantage of the Web as an advertising
10 medium is that a single connection allows access by millions of potential customers around the world, without any need for the customers to know or be interested in the physical location of the server computer which is providing the information. Links to the pages of interest may be
15 provided by hundreds or thousands of other pages, provided on other servers, throughout the world.

For many goods and services, the lack of a physical "place" on the Internet is an advantage. A consumer, no matter where his location, is presented with a familiar
20 interface, which makes access very straightforward. The very size of the World Wide Web however, means that, as presently constituted, it is not well suited to answering questions about places and proximity. For example, it is not possible, using existing Web search tools to answer
25 questions such as "where is the nearest hamburger restaurant?" in spite of the enormous benefit which would accrue to major restaurant chains and the like in providing their own answers to such questions, with the speed and ease for which the Internet is famous.

30 The present invention seeks to address the problem of facilitating access by Internet users, and in particular by users of the World Wide Web, to Internet resources, where the primary differentiator between different places of interest is geographical.

35 According to a first aspect of the present invention, there is provided a method of operating a computer system,

the method comprising the steps of:

storing on a map server computer map data
representative of a map of a geographical area;

5 storing on the map server computer coordinate data
indicative of the spatial coordinates of at least one point
associated with the geographical area represented by the
map, so as to enable correlation of points on the map with
their corresponding geographical location;

10 storing on an information server computer information
data relating to at least one place of interest within the
geographical area, said information data including data
representative of the spatial coordinates of the place of
interest within the area;

15 transmitting a map request to the map server computer
from a client computer, and transmitting from the map
server computer to the client computer in response to the
map request the map data and the coordinate data associated
with the area represented by the map;

20 utilising the map data to display an image of the map
on a visual display unit associated with the client
computer;

25 transmitting an information request to the information
server computer from the client computer, and transmitting
from the information server computer to the client computer
in response to the information request the information data
relating to at least one place of interest within the
geographical area; and,

30 displaying the information data relating to at least
one place of interest on the visual display unit.

The map request may be transmitted before the
information request, the information request being
formulated by including coordinate data provided by the map
server.

35 The information request may be transmitted before the
map request, the map request being formulated by including
coordinate data provided by the information server.

According to a second aspect of the present invention, there is provided a computer system, the computer system comprising:

5 a map server computer for storing map data representative of a map of a geographical area and coordinate data representative of the spatial coordinates of at least one point lying within the area represented by the map;

10 an information server computer for storing information data representative of at least one place of interest within the geographical area, said data including data representative of the spatial coordinates of the place of interest within the area; and,

15 a client computer, the client computer having a visual display unit;

wherein the client computer includes

20 means for transmitting a map request to the map server computer to request transfer to the client computer of the map data and the coordinate data associated with the area represented by the map,

means for displaying an image of the map on the visual display unit, and

25 means for transmitting an information request to the information server computer to identify places of interest known to it and lying within the geographical area,

30 wherein the information server computer includes means for transmitting to the client computer in response to the information request the data representative of at least one place of interest within the geographical area, and

wherein the client computer includes means for displaying said data associated with the place of interest on the visual display unit.

35 The order in which the map server and information server are mentioned above is not meant to imply any particular restriction as to the order in which the servers

are accessed by the client. As with any Web search, either server could be accessed first. A link provided initially by the information server may link directly to a map server in accordance with the invention, for example.

5 In a preferred embodiment, a client device which has the capabilities of both a cellular telephone and a Web browser may pass the names and/or geographical coordinates of its surrounding cellular base stations to the map and/or overlay server computers. Such location information may be
10 utilised by the map server computer to deliver a map of the current location of the client device, and/or by the overlay server computer to identify facilities near to the current location of the client device.

The information relating to the place of interest may
15 be superimposed or overlaid on the map image at a position on the image corresponding to the location of the place of interest on the map. Thus, for example, the information (or "overlay") server may contain details of, for example, hotels, restaurants, shops or the like, associated with the
20 geographical coordinates of each location. The map server contains map data, including coordinate data representing the spatial coordinates of at least one point on the area represented by the map. Further data is also required, so as to enable correlation of points on the map with their
25 corresponding geographical location. Such further data may be, for example, the coordinates of an additional point on the map. Preferably, the map's scale and overall dimensions are included. Alternatively, coordinates of two opposite corners of the map are included. As a further
30 alternative, the said further data may include a simple scale factor and a direction factor.

In a further preferred embodiment, the map server may be provided with a list of categories of places of interest, together with details of the respective
35 information servers on which further information about each category is located. Each of these categories may be

associated with a respective icon on the VDU of the client. In an alternative embodiment, such a list of categories may be provided on a further server.

5 In an embodiment, initially, the client computer may display the map as a simple outline, with no superimposed icons. When one of the "category" icons is activated (for example, by clicking with a mouse or other pointing device), the client computer formulates a request to the appropriate information server for the information server to supply a list of locations known to it which lie within the rectangle defined by the said coordinates. The information supplied by the information server may include textual, graphical, sound, video or other information, and may include additional hypertext links to other locations or facilities on the Web, which themselves may include textual, graphical, sound, video or other information.

10 It is a particular advantage of the system that the various information servers do not need to have knowledge of the map server software provided on the map server, and vice versa. All that is required in order for the relevant data to be supplied to the client computer is a consistent protocol for providing the coordinates of the various places of interest.

20 Two or more information servers can provide "places of interest" data independently, without either having any knowledge of the other. For example, one server may provide locations of hotels, a second may provide locations of restaurants, and a third may provide locations of print shops or the like. All of the data (for example, hypertext links, icons etc.) can be overlaid on a single map on the screen of the client computer with hypertext links provided to the various source data on the different overlay or information server computers.

30 In a particularly preferred embodiment, the client computer may include locating means for establishing the current geographical location of the client computer. This

may be by means of a satellite system such as the Global Positioning System. The client computer preferably includes means for passing the said location information to the information server computer. Such location information
5 may be utilised by the information server computer to identify facilities within a given radius of the current geographical location of the client computer. This facility makes the method of the invention of particular usefulness to portable computer systems.

10 The client computer may include means for scrolling or zooming the map image, to display an image of a different geographical area, and means for varying the displayed data relating to the places of interest, so as to take account of the change in the display geographical area. This may
15 take the form simply of changing the position of the icon or hypertext data relating to particular points of interest, so as to take account of the change in the display geographical area. Preferably, however, the client computer may include means for formulating a further
20 request to an information server, to identify places of interest lying within the new geographical area.

An embodiment of the present invention will now be described by way of example with reference to the accompanying drawings, in which:

25 Figure 1 is a graphical representation of a client screen, showing a simple map with "category" icons;

Figure 2 shows the same map after retrieval of information relating to various places of interest (in this case, hotels and restaurants); and,

30 Figure 3 is a schematic representation of information flow between the map and overlay servers and the client computer.

Referring to Figure 1, the screen 1 of a client computer 10 is shown, as generated by an HTML document.

35 The screen 1 contains three windows or frames: a "map" frame 2, a "navigation" frame 3 containing buttons 4 for

zooming and panning the map, and an "info" frame 5 which controls the display of overlay information on the map.

The overall information flow is indicated graphically in Figure 3. A map request to a map server computer 11 from the client computer 10 specifies the geographical coordinates of the map, which may be the bottom left corner of the map and the top right corner of the map or centre point and scale, for example. The coordinates may be supplied to the map server 11 as the latitude and longitude in degrees of the centre point of the map and its scale, for example.

The map is supplied by the map server 11 in a map response in any of the various conventional graphics formats, for example in "GIF" or "JPEG" format. In a preferred embodiment, the map server 11 will also return the coordinates covered by the map, but this is not essential as they may be inferred from the map request.

Also supplied by the map server 11 are the icons 6,7,8,9, which are displayed within the "info" frame 5. Icon 6 indicates banks, icon 7 restaurants, icon 8 hotels, etc. Information relating to each category of facilities (banks, restaurants, hotels, etc.) is held on an information server computer 12. The information server computers 12 for the different information categories may be the same or different.

Clicking with the mouse on a respective icon 6-9 causes the client computer 10 to formulate an information request, which may be in the form of a standard Web URL (Uniform Resource Locator) including additional protocol elements relating to the location which the user wishes to search.

An important feature of the present invention is the addition of a universally recognised standard for geographic reference (i.e. longitude and latitude) to the protocols and standards of the Internet and the World Wide Web, and its use to combine data from mutually independent

sources.

Information requests produced by the client computer 10 may be of various forms, provided that a protocol is provided for the exchange of the geographical coordinate data.

Figure 3 shows the two key transaction types used by the client 10. One transaction type consists of the information request, which goes to a provider of information to be overlaid on a map, such as an information server computer 12, followed by a response from that provider 12. The other transaction type is a map request, which goes to a map server computer 11, followed by a map response back to the client 10.

Both request types take the form of Uniform Resource Locators (URLs) which are transmitted in the same way as any other WWW request. Unlike other URLs, the map and information requests contain longitude and latitude information which specify the request's geographical coverage.

In a preferred embodiment, the responses also contain longitude and latitude information, but this is not essential as they may be inferred from the requests.

In a simple embodiment, the information response from the overlay or information server 12 consists of an HTML document. This document contains HTML tags specifying one or more overlay icons and their screen positions. It also specifies the map to be displayed underneath the icons.

In a more advanced embodiment, suitable for client browsers capable of running Java or some other local processing capability, the response from the information server 12 specifies one or more overlay icons and associates a longitude and latitude with each. Longitude and latitude are resolved to screen position by a Java Applet or other locally executed program.

The most important difference between the simple embodiment and the advanced embodiment mentioned above is

the point at which the longitude and latitude of overlay icons are resolved to positions on the screen 1 of the client 10. Advanced embodiments place this function within the client browser, where a Java Applet or some other local processing carries out the transformation. In simple
5 embodiments, the transformation is carried out in the information server. Simpler embodiments are therefore less powerful and have less platform-independence, but can be implemented on simple client browsers.

10 The "map request" shown in Figure 3 may take the following form:

```
http://www.multimap.com?lon="-0.1666"  
      &lat="51.545"&scale="25000"&xp="500"&yp="300"
```

15

This map request contains parameters specifying the longitude, latitude and scale of the map, and also its dimensions in horizontal and vertical pixels (xp and yp).

An "information request" may be of the form:

20

```
http://mcdonalds.com/locations.cgi?lat="51.5449"  
      &lon="-0.16658"&radius="1.6"
```

25 This is a search request to a server called mcdonalds.com requesting all locations within a one mile radius of a location in Hampstead, London.

The map requests and information requests may contain any number of elements from an expandable list of parameters, including the following examples:

30

lat=51.5449	Latitude in degrees, as a single real number
lon=-0.16658	Longitude in degrees, as a single real number
radius=1.6	Radius in kilometres
35 max=10	Maximum number of locations in search result
xp=500	Horizontal size of the map in pixels

```

lon=-0.16658      Longitude in degrees, as a single real
                   number
radius=1.6         Radius in kilometres
max=10            Maximum number of locations in search result
5  xp=500          Horizontal size of the map in pixels
   yp=300          Vertical size of the map in pixels
   scale=25000     Map scale
   vr=0            Virtual Reality level - 0 for "reality",
                   other values specify other "virtual worlds"
10                for testing, simulation or whatever

```

There are a number of other possible terms that may be included.

In simpler embodiments, the map response is an image file encoded in either GIF or JPEG format, for example. It is sent in the same format as other image files on the Web. In more advanced embodiments, the map response may be take the form of either a raster image or vector data, and may be rendered at the client by a Java Applet or other local processing.

The information response can take one of a number of different forms, depending on the capabilities of the client browser.

In a preferred implementation, the information response takes the form of an HTML document which contains references to one or more overlay icons, each with an associated longitude and latitude, together with a call to a Java Applet or some other form of local processing.

In a simpler implementation, the HTML document may
30 contain the screen positions of the icons as pixel offsets
rather than longitude and latitude. In this case the
positioning of overlay icons on maps is achieved through
the positioning capabilities of other HTML functions such
as background images, frames, horizontal and vertical image
35 offsets and others.

An example of such an information response is:

```
<HTML> <BODY background="http://multimap.com?  
lon=-0.1666&lat=51.545&scale=25000&xp=500&yp=300">  
<imgsrc="icon.gif" hspace=240 vspace=140> </BODY></HTML>.
```

In this example, a map is requested from the map server
5 "multimap.com" and is displayed as a background image, and
the icon in the file "icon.gif" is overlaid at the centre
of the map. Preferably, in order to work correctly, this
"map as background" technique should be implemented within
a fixed-size frame.

10 When the user clicks on one of the subject buttons
6-9, the client 10 establishes a connection to the
information server whose URL is embedded in the button 6-9.
The client 10 sends an information request, as described
above.

15 The information server 12 generates a list of the
entries in its database having a longitude and latitude
within the bounds specified, and uses them to create an
information response, as described above. Each entry is
associated with a displayable name and/or icon and
20 optionally a longitude and latitude. The icons or text may
be highlighted to show further information such as levels
of availability, etc.

The client software normally overlays the displayable
names and/or icons on its map.

25 The user has the option of opening one or more icons
from the screen, normally by clicking on the displayable
name. This passes the URL to the Web browser which opens
it in the usual manner.

In Figure 2, the current location has been sent to
30 three servers: one run by a high street bank, which
returns the location of cashpoint machines, one by an
independent hotel reservation system and one by a well-
known fast food chain.

The result of the responses by the overlay servers 12
35 are shown in Figure 2, in which the same map is displayed
with icons 13 representing the various facilities reported

by the second server 12, and hypertext links 14 to text pages or other Web facilities, in the usual way.

It should be noted that the client computer 10 may be used to transmit the information request with geographical data first. The overlay or information server 12 responds with information data, including coordinate data, relating to the requested services for example. This data, as well as being used to generate the display on the client computer 10, can be used to formulate the map request including coordinate data for transmission by the client computer 10 to the map server 11. The map server 11 then responds with the map data, which is then transmitted to the client computer 10. The map can then be displayed on the client computer visual display unit and overlaid with graphics representing the information data. In other words, either the map request or the information request can be formulated first for transmission to the appropriate server 11,12.

The architecture of the preferred system is such that it can support a movable map window. A user can scroll North, South, East or West on the screen and see more detail appear, and can zoom in and out for more detail or for a wider perspective using the zoom and move buttons 4. This also enables a moving display, such as a hand-held device or a rolling map installed in a car, to be dynamically updated with new locations as the displayable window moves over them.

Although the client computer 10 may be a stationary PC connected to the Internet, the architecture is designed to support mobile clients such as car navigation systems and personal digital assistants (PDAs). The client software preferably supports direct connection to Global Positioning System (GPS) receivers, and preferably implements the NMEA 0183 standard for exchange of navigational data. If the client is also a cellular telephone, it preferably supports the transfer of information derived from the cellular

network. In a preferred embodiment, the client transfers its own position to the information server and map server within the HTTP protocol by adding an HTTP header line to its request messages. In the case that the client is
5 connected to a GPS receiver and therefore knows its exact location, it can add an HTTP header line as follows:
remote_position: lon="-0.1666"; lat="51.545". In the case that the client does not have its exact position, but does have access to the name of its nearest cellular base
10 station, it can add an HTTP header line as follows:
remote_cellname: LONDON-SW-5. A map server or information server which maintains data on the locations of cellular base stations can convert the cell name to a location and deliver the appropriate map and/or overlay information. In
15 the case that the client is not able to add HTTP header lines as described above, location and/or cell names may be transmitted within other HTTP headers or within the HTML protocol, but such embodiments are not considered preferable. It is important to note that the client will
20 often request information on a location other than its own current location, and that the location of interest is transferred within the Map Request/Information Request URLs, while the client's own location is transferred in the HTTP header. This combination allows the server computers
25 to implement a wide range of additional functions, such as displaying the distance from the current location to the location of interest. In the case that the client's location is known to be changing, such as a cellular phone connected to a GPS receiver, the screen display may be
30 refreshed on a regular basis to show the client's current location. This refresh may be achieved by using the "refresh" function within the HTTP/HTML protocols, or it may be achieved using the local programmability of the client.

35 It is particularly preferred that the additional functionality provided within the World Wide Web, and its

architecture, is built within the extensible framework of HyperText Markup Language (HTML) and the HyperText Transfer Protocol (HTTP). The extensions to HTML/HTTP are thus preferably entirely compatible with existing Web standards
5 and do not seek to modify or replace any part of the Web architecture.

In a preferred embodiment, the functionality described above is added to the client computer 10 by providing additional software for a known Web browser (for example,
10 Netscape, Mosaic, etc.). This software may be implemented as separate programs (i.e. a "helper application"), or as plug-in programs that execute within a browser program, or as Java Applets which are downloaded and executed as required.

15 Alternatively, a subset of the full functionality may be implemented using the browser's standard display and positioning capabilities only. An implementation of the latter case requires greater functionality in the information server, and is a preferred implementation in
20 circumstances where it is difficult or impossible to add functionality to the client browser.

The server computers 11,12 may employ well-known standard database tools in conjunction with known Web server packages, in order to recognise the requests and
25 generate the responses described above.

Another important feature of the present invention is that maps and overlay information can be "persistent". That is, pointers to maps or places can be stored in databases on the client computer 10 and become a permanent
30 feature of displays. A typical use of this feature would be to store the user's home location and display it on any map covering that location.

In a preferred embodiment, persistent locations are stored using the extensions to HTTP known as "magic
35 cookies". The magic cookie parameters used are based upon the request parameters listed above, i.e.:

Set-Cookie: Home="lon=-0.1666&lat=51.545";

Software may be provided for the conversion of postal codes (zip codes) into longitude and latitude information.

5 Software may be provided for the conversion of full or partial addresses into longitude and latitude information. This software is normally provided on the map server 11; in this case, the user enters an address or postcode in a form and sends this to the map server. The map server responds

10 with an HTML document containing longitude and latitude, and the user receives a map of the locality of the address or postcode. Alternatively, such software can be provided on the client computer 10.

The system and method of the present invention avoids

15 the classic problems of Geographic Information Systems (GISs) by imposing a single, standardised geographic reference model, and restricting data exchanges to those classes of geographic information which can conform to the reference model.

20 Because of this, servers providing information do not have to deal with maps, map ownership issues or mapping software, and information from several different sources can be integrated on a single screen.

It is of course envisaged that the invention may be

25 implemented in ways which are different from the ways specifically exemplified above. For example, the coordinate data embodied in the map and facility information may be presented in ways other than in absolute latitude and longitude format.

30 Embodiments of the present invention have been described with particular reference to the examples illustrated. However, it will be appreciated that variations and modifications may be made to the examples described within the scope of the present invention.

CLAIMS

1. A method of operating a computer system, the method comprising the steps of:

- 5 storing on a map server computer (11) map data representative of a map of a geographical area;
 storing on the map server computer (11) coordinate data indicative of the spatial coordinates of at least one point associated with the geographical area represented by
10 the map, so as to enable correlation of points on the map with their corresponding geographical location;
 storing on an information server computer (12) information data relating to at least one place of interest within the geographical area, said information data
15 including data representative of the spatial coordinates of the place of interest within the area;
 transmitting a map request to the map server computer (11) from a client computer (10), and transmitting from the map server computer (11) to the client computer (10) in
20 response to the map request the map data and the coordinate data associated with the area represented by the map;
 utilising the map data to display an image of the map on a visual display unit (1) associated with the client computer (10);
25 transmitting an information request to the information server computer (12) from the client computer (10), and transmitting from the information server computer (12) to the client computer (10) in response to the information request the information data relating to at least one place
30 of interest within the geographical area; and,
 displaying the information data relating to at least one place of interest on the visual display unit (1).

2. A method according to claim 1, wherein the map request
35 is transmitted before the information request, the

information request being formulated by including coordinate data provided by the map server (11).

3. A method according to claim 1, wherein the information
5 request is transmitted before the map request, the map request being formulated by including coordinate data provided by the information server (12).

10 4. A method according to any of claims 1 to 3, including the step of superimposing information relating to the place of interest on the image on the visual display unit, at a position on the image corresponding to the location of the place of interest on the map.

15 5. A method according to claim 4, wherein the information superimposed on the image is a hypertext link.

20 6. A method according to claim 4 or claim 5, wherein the client computer (10) includes means for scrolling the map image to display an image of a different geographical area, and means for varying the displayed data relating to the at least one place of interest on the visual display unit (1) so as to take account of the change in the displayed geographical area.

25 7. A method according to claim 6, wherein the varying of the displayed data includes the step of shifting the position of the superimposed information in response to scrolling of the map image.

30 8. A method according to claim 7, wherein the client computer (10) includes means for formulating a further request to the information server (12) to identify places of interest lying within the different geographical area.

35

9. A method according to any of the preceding claims,
wherein the client computer (10) includes means for zooming
the map image in or out to display an image of,
respectively, a smaller or larger geographical area, and
5 means for varying the displayed data relating to the at
least one place of interest on the visual display unit so
as to take account of the smaller or larger geographical
area.

10 10. A method according to claim 9, wherein the client
computer (10) includes means for formulating a further
request to the information server (12), to identify places
of interest lying within the smaller or larger geographical
area.

15 11. A method according to any of the preceding claims,
including the steps of:

storing on the map server computer (11) a list of
categories of places of interest;

20 retrieving the list with the map data; and,
displaying on the visual display unit (1) a respective
icon (6,7,8,9) for each said category.

12. A method according to any of the preceding claims,
25 wherein the request is effected by activation of a
respective icon on the visual display unit (1).

13. A method according to any of the preceding claims,
wherein the client computer (10) includes locating means
30 for establishing the current geographical location of the
client computer (10), and including the step of passing the
current geographical location of the client computer (10)
to at least one of the map server computer (11) and the
information server computer (12).

14. A method according to claim 13, wherein the locating means uses the Global Positioning System.

15. A method according to claim 13, wherein the locating means includes a cellular telephone.

16. A method according to any of claims 13 to 15, wherein the client computer (10) includes means for superimposing on the image an icon indicative of the current geographical location.

17. A computer system, the computer system comprising:
a map server computer (11) for storing map data representative of a map of a geographical area and coordinate data representative of the spatial coordinates of at least one point lying within the area represented by the map;
an information server computer (12) for storing information data representative of at least one place of interest within the geographical area, said data including data representative of the spatial coordinates of the place of interest within the area; and,
a client computer (10), the client computer (10) having a visual display unit (1);
wherein the client computer (10) includes
means for transmitting a map request to the map server computer (11) to request transfer to the client computer (10) of the map data and the coordinate data associated with the area represented by the map,
means for displaying an image of the map on the visual display unit (1), and
means for transmitting an information request to the information server computer (12) to identify places of interest known to it and lying within the geographical area,

wherein the information server computer (12) includes means for transmitting to the client computer (10) in response to the information request the data representative of at least one place of interest within the geographical area, and

wherein the client computer (10) includes means for displaying said data associated with the place of interest on the visual display unit (1).

18. A computer system according to claim 17, wherein the client computer (10) includes means for formulating the information request by including coordinate data provided by the map server (11).

19. A computer system according to claim 17, wherein the client computer (10) includes means for formulating the map request by including coordinate data provided by the information server (12).

20. A computer system according to any of claims 17 to 19, wherein the client computer (10) includes means for superimposing information relating to the place of interest on the image on the visual display unit (1), at a position on the image corresponding to the location of the place of interest on the map.

21. A computer system according to claim 20, wherein the information superimposed on the image is a hypertext link.

22. A computer system according to claim 20 or claim 21, wherein the client computer (10) includes means for scrolling the map image to display an image of a different geographical area, and means for varying the displayed data relating to the at least one place of interest on the visual display unit so as to take account of the change in the displayed geographical area.

23. A computer system according to claim 22, wherein the client computer (10) includes means for varying the information from the information server computer (12) which is displayed, in response to scrolling of the map image.

5

24. A computer system according to claim 23, wherein the client computer (10) includes means for formulating a further request to the information server computer (12), to identify places of interest lying within the different geographical area.

10

25. A computer system according to any of claims 17 to 24, wherein the client computer (10) includes means for zooming the map image in or out to display an image of, respectively, a smaller or larger geographical area, and means for varying the displayed data relating to the at least one place of interest on the visual display unit so as to take account of the smaller or larger geographical area.

15
20

26. A computer system according to claim 25, wherein the client computer (10) includes means for formulating a further request to the information server computer (12), to identify places of interest lying within the smaller or larger geographical area.

25

27. A computer system according to any of claims 17 to 26, wherein the client computer (10) includes locating means for establishing the current geographical location of the client computer (10) and means for passing the current geographical location of the client computer (10) to at least one of the map server computer (11) and the information server computer (12).

30

28. A computer system, substantially as described with reference to the accompanying drawings.

35

29. A method of operating a computer system, substantially as described with reference to the accompanying drawings.

COMPUTER SYSTEM FOR IDENTIFYING LOCAL RESOURCES

ABSTRACT

5 A map of the area of a client computer (10) is
requested from a map server (11). Information relating to
a place of interest is requested from an information server
(12) by the client computer (10). The information is
superimposed or overlaid on a map image at a position on
10 the map image corresponding to the location of the place of
interest on the map. The information (or "overlay") server
(12) may contain details of, for example, hotels,
restaurants, shops or the like, associated with the
geographical coordinates of each location. The map server
15 (11) contains map data, including coordinate data
representing the spatial coordinates of at least one point
on the area represented by the map.



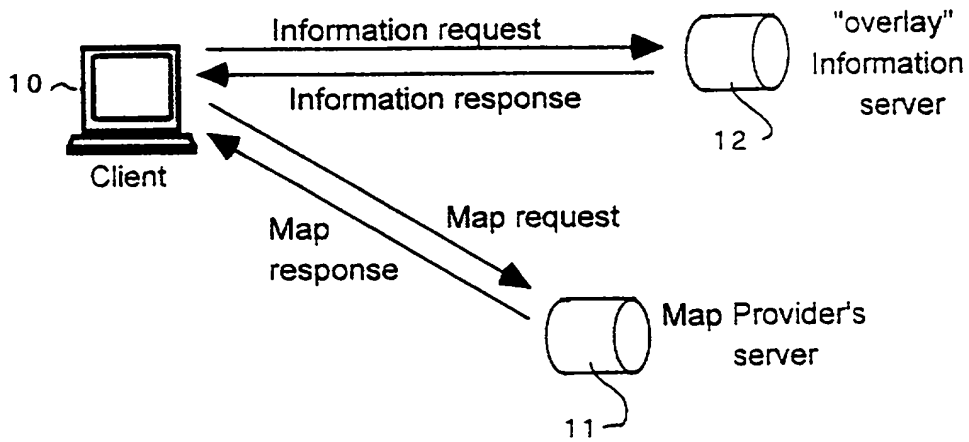


FIGURE 3

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the INVENTION ENTITLED COMPUTER SYSTEM FOR IDENTIFYING LOCAL RESOURCES

the specification of which (CHECK applicable BOX(ES))

> [] is attached hereto.

> [] was filed on _____ as U.S. Application No. 0 _____

BOX(ES) > [X] was filed as PCT International Application No. PCT/GB96 / 01996 on 15 August 1996

> and (if applicable to U.S. or PCT application) was amended on _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56. I hereby claim foreign priority benefits under 35 U.S.C. 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which priority is claimed, or (2) if no priority claimed, before the filing date of this application:

PRIOR FOREIGN APPLICATION(S)		Date first Laid- open or Published	Date Patented or Granted	Priority Claimed Yes No
Number	Country	Day/MONTH/Year Filed		
9516762.3	GB	16 August 1995		X

I hereby claim domestic priority benefit under 35 U.S.C 120/365 of the indicated United States applications listed below and PCT international applications listed above or below and, if this is a continuation-in-part (CIP) application, insofar as the subject matter disclosed and claimed in this application is in addition to that disclosed in such prior applications, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56 which became available between the filing date of each such prior application and the national or PCT international filing date of this application:

PRIOR U.S. PROVISIONAL, NONPROVISIONAL AND/OR PCT APPLICATION(S)		Status	Priority Claimed Yes No
Application No. (series code/serial no.)	Day/MONTH/Year Filed	pending, abandoned, patented	
PCT/GB96/01996	15 August 1996	pending	X

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And I hereby appoint Cushman Darby & Cushman Intellectual Property Group of Pillsbury Madison & Sutro LLP, 1100 New York Avenue, N.W., Ninth Floor, East Tower, Washington, D.C. 20005-3918, telephone number (202) 861-3000 (to whom all communications are to be directed), and the below-named persons (of the same address) individually and collectively my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent, and I hereby authorize them to delete names/numbers below of persons no longer with their firm and to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/organization who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct the above Firm and/or a below attorney in writing to the contrary.

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Applicant or Patentee PHELAN
Serial or Patent No.: _____ Atty. Dkt No 245063
Filed or Issued: February 13, 1998
For: COMPUTER SYSTEM FOR IDENTIFYING LOCAL RESOURCES

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9(f) and 1.27(b)) - INDEPENDENT INVENTOR**

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled COMPUTER SYSTEM FOR IDENTIFYING LOCAL RESOURCES described in

- ☒ (X) the specification filed herewith
☐ () application serial no. _____, filed February 13, 1998
☐ () patent no. _____, issued _____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e)

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- ☒ (X) no such person, concern, or organization
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*NOTE Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

FULL NAME _____
ADDRESS _____

☐ () INDIVIDUAL ☐ () SMALL BUSINESS CONCERN ☐ () NONPROFIT ORGANIZATION

FULL NAME _____
ADDRESS _____

☐ () INDIVIDUAL ☐ () SMALL BUSINESS CONCERN ☐ () NONPROFIT ORGANIZATION

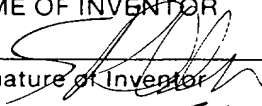
FULL NAME _____
ADDRESS _____

☐ () INDIVIDUAL ☐ () SMALL BUSINESS CONCERN ☐ () NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed

Sean PHELAN

NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
		
Signature of Inventor	Signature of Inventor	Signature of Inventor
<u>23 - JAN - 98</u>		
Date	Date	Date